

REMARKS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1-85 are pending in this application. Claims 1-32, 34-36, 50-53, 67, 68 and 79-83 are withdrawn from consideration as being directed to non-elected species. Claims 84 and 85 are newly added.

Claim Rejections – 35 U.S.C. § 112

Claims 33, 27, 41, 43-44, 49, 54 and 57 are rejected under 35 U.S.C. § 112, first paragraph.

Applicant note that the Examiner rejected claim 27 under § 112, however claim 27 has been withdrawn from consideration.

Claim 44 has been cancelled without prejudice or disclaimer. Therefore the rejection of claim 44 is rendered moot.

Claims 33, 41, 43, 49, 54 and 57 have been amended to further clarify the claim language. The relationship between the elements of the claim is clarified. Therefore, one of ordinary skill in the art would understand the scope of the claims as amended.

Therefore, Applicant respectfully submits that claims 33, 41, 43, 49, 54 and 57 are fully compliant with § 112, first paragraph. Thus, Applicant respectfully requests that the rejection of claims 33, 41, 43-44, 49, 54 and 57 under § 112, first paragraph be withdrawn.

Claims 41-49, 54-66, 69, 70, 71, 72, 73-76, and 77-78 are rejected under 35 U.S.C. § 112, second paragraph.

Claims 44, 46 and 47 have been cancelled without prejudice or disclaimer. Therefore, the rejection of claims 44, 46 and 47 is rendered moot.

Applicant has amended the claims to further clarify the claim language. The relationship between the various elements in the claims is clarified. Applicant submits that the claims are definite.

Therefore, Applicant respectfully submits that claims 41-49, 54-66, 69, 70, 71, 72, 73-76, and 77-78 are fully compliant with § 112, second paragraph. Thus, Applicant respectfully

requests that the rejection of claims 41-49, 54-66, 69, 70, 71, 72, 73-76, and 77-78 under § 112, second paragraph be withdrawn.

Claim Rejections – 35 U.S.C. § 102

Claims 33, 37-49 are rejected under 35 U.S.C. § 102(b) as being anticipated by Baba *et al.* (US Patent No. 4,872,743). Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner contends that Baba *et al.* discloses a system with a reflective variable lens with an oval section. Applicant respectfully disagrees.

Claim 33 has been amended to recite, *inter-alia*, “an optical system constructed and arranged to form an object image, said optical system comprising a variable optical-property element; an image sensor constructed and arranged to image said object image; and an image processing device for performing an image processing by using an image data obtained by said image sensor, said image processing device comprising a process for carrying out a process for modifying said image data in response to a change of light deflective action of said variable optical-property element.”

Baba *et al.* teaches an optical element comprising a medium whose refractive index is variable by temperature and consequently the focal length of an optical element is varied.

However, Baba *et al.* does not disclose, teach or suggest performing an image processing which comprises carrying out a process for modifying the image data in response to a change of light deflective action of the variable optical property element. Consequently, Baba *et al.* does not disclose, teach or suggest the subject matter recited in claim 33.

Claim 37 has been amended to recite, *inter-alia*, “a variable optical-property mirror comprising a rotationally asymmetric reflecting surface of a shape wherein the length of one direction is different from that of the other direction; and a driving circuit constructed and arranged to drive said variable optical-property mirror.”

As stated above, Baba *et al.* teaches an optical element comprising a medium whose refractive index is variable by temperature and consequently the focal length of an optical element is varied.

However, in Fig. 1C of Baba *et al.* the shape of light reflecting layer R which reflects an incident light is always plane and the curved feature 7 is merely a representation of the

index gradient (see Col. 4, lines 40-45 in *Baba et al.*). Moreover, any driving circuit for driving the light reflecting layer R is not mounted. Accordingly, *Baba et al.* does not disclose, teach or suggest a mirror, which is driven by a driving circuit and a rotationally asymmetric reflecting surface. Consequently, *Baba et al.* does not disclose, teach or suggest the subject matter recited in claim 37.

Claim 40 has been amended to recite, *inter-alia*, “a variable optical-property mirror having a reflecting surface of a shape wherein the length of one direction is longer than that of the other direction, and arranged so that the one direction of said reflecting surface coincides with a direction wherein a cross line between said reflecting surface and a plane on which rays incident on and emergent from said variable optical-property mirror lie extends.”

*Baba et al.* merely discloses an optical element comprising a medium whose refractive index is variable by temperature and consequently the focal length of an optical element is varied. However, *Baba et al.* does not disclose, teach or suggest a variable optical-property mirror having a reflecting surface wherein the length of one direction is longer than that of the other direction. Moreover, *Baba et al.* does not disclose, teach or suggest how to dispose the element 9 in Figure 1C with respect to the direction of an incident light and a reflecting light. Therefore, *Baba et al.* does not disclose, teach or suggest the shape of variable optical-property mirror, much less the arrangement of the mirror's shape relative the direction of the rays incident on and emergent from the mirror. Consequently, *Baba et al.* does not disclose, teach or suggest the subject matter recited in claim 40.

Claim 41 has been amended to recite, *inter-alia*, “a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said variable optical-property element.”

*Baba et al.* does not disclose, teach or suggest an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of the variable optical-property element. The Oval section 66 in Figure 12C merely represents an index gradient formed in medium 62 (see Col. 8, lines 45-46 in *Baba et al.*) and thus this feature is completely different from the rotationally asymmetric surface of the variable optical-property element recited in claim 41. Consequently, *Baba et al.* does not disclose, teach or suggest the subject matter recited in claim 41.

Claim 43 has been amended to recite, *inter-alia*, “An optical system, consisting of: a rotationally asymmetric surface; and a variable optical-property mirror constructed with a variable shape mirror.”

Baba *et al.* does not disclose, teach or suggest an optical system consisting of a rotationally asymmetric surface and a variable optical-property mirror only. Baba *et al.* merely teaches a varifocal optical element whose refractive index is variable by temperature wherein temperature distribution causes an index gradient to form. Consequently, Baba *et al.* does not disclose, teach or suggest the subject matter recited in claim 43.

Claim 45 has been amended to recite, *inter-alia*, “an optical element having a rotationally asymmetric surface; and a variable optical-property mirror unit comprising a variable optical-property mirror, an image sensor disposed at a position of an image formed by said image sensor and said variable optical-property mirror, and a holding member supporting both of said variable optical-property mirror and said image sensor.”

Baba *et al.* does not disclose, teach or suggest a variable optical-property mirror, and a holding member supporting both the variable optical-property mirror and an image sensor. Consequently, Baba *et al.* does not disclose, teach or suggest the subject matter recited in claim 45.

Claim 49 has been amended to recite, *inter-alia*, “a variable optical-property mirror; and an optical element disposed at the front side or the back side of said variable optical-property mirror and having a plurality of rotationally asymmetric surfaces and one symmetric surface.”

Baba *et al.* does not disclose, teach or suggest an optical element disposed before or behind a variable optical-property mirror and having one symmetric surface. Consequently, Baba *et al.* does not disclose, teach or suggest the subject matter recited in claim 49.

Claims 44, 46 and 47 have been cancelled without prejudice or disclaimer. Therefore the § 102 rejection of claims 44, 46 and 47 is rendered moot.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45 and 49 and claims 38, 39, 42 and 48 which are dependent from either claim 33 or 41 are patentable and respectfully request that the § 102 (b) rejection of claims 33 and 37-49 be withdrawn.

Claims 33, 37-49 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sakai *et al.* (US patent No. 5,020,903). Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner contends that Sakai *et al.* discloses a system with a reflective variable lens with an oval section. Applicant respectfully disagrees.

With regard to claim 33, Sakai *et al.* simply teaches an optical system for a velocity measurement apparatus. Sakai *et al.* teaches that lenses 109 and 111 in Fig. 5, lens 313 in Figs. 17-19, lens 317 in Fig. 20 and lens 323 in Fig. 21 are of a transparent type. Sakai *et al.* does not disclose, teach or suggest a variable optical property element. In addition, Sakai *et al.* does not disclose, teach or suggest carrying out a processing for modifying the image data in response to a change of light deflective action of the variable optical property element. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 33.

With regard to claim 37, for at least the reasons provided above for claim 33, Sakai *et al.* does not disclose, teach or suggest a driving circuit that drives a lens. Moreover, Sakai *et al.* does not disclose, teach or suggest that the lens surface of such lenses is a rotationally asymmetric. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 37.

With regard to claim 40, as stated above the lenses of Sakai *et al.* are of transparent type. Thus, the lenses of Sakai *et al.* do not reflect light. Accordingly, Sakai *et al.* does not disclose, teach or suggest a reflecting surface for reflecting light much less the shape of the reflecting surface variable optical-property mirror for reflecting an incident light. Moreover, Sakai *et al.* does not disclose, teach or suggest how to dispose an optical element with respect to the direction of an incident light and a reflecting light. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 40.

With regard to claim 41, Sakai *et al.* does not disclose, teach or suggest an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said variable optical-property element. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 41.

With regard to claim 43, Sakai *et al.* does not disclose, teach or suggest an optical system consisting of a rotationally asymmetric surface and a variable optical-property mirror

only. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 43.

With regard to claim 45, Sakai *et al.* does not disclose, teach or suggest a variable optical-property mirror, much less a holding member supporting both of the variable optical-property mirror and the image sensor. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 45.

With regard to claim 49, Sakai *et al.* does not disclose, teach or suggest a variable optical-property mirror, much less an optical element disposed before or behind a variable optical-property mirror and having one symmetric surface. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claim 49.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45 and 49 and claims 38, 39, 42 and 48 which are dependent from either claim 33 or 41 are patentable and respectfully request that the § 102 (b) rejection of claims 33 and 37-49 be withdrawn.

#### Claim Rejections – 35 U.S.C. § 103

Claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76, 77-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Olmstead *et al.* (US Pat. No. 6,073,851). Applicant respectfully traverses this rejection for at least the following reasons.

With regard to claim 33, Olmstead *et al.* simply teaches an optical reader having multi-focal lens. As shown in Fig. 22 of Olmstead *et al.*, an optical plane with a plurality of ring like structures is formed on concentric circles and each of the ring like structures focuses the incident light concentrate at different positions. Accordingly, a long depth of focus is obtained by using such multi-focal lens. However the shape of each of the ring like structures is fixed. Therefore, this multi-focal lens does not allow varying the depth of focus. Specifically, Olmstead *et al.* does not disclose, teach or suggest a variable optical property element. Moreover, Olmstead *et al.* does not disclose, teach or suggest carrying out a processing for modifying the image data in response to a change of light deflective action of the variable optical property element. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 33.

With regard to claim 37, Figs. 39A and B of Olmstead *et al.* show the constitution of reflective type optical element, but the focal point of each reflective surface is fixed.

Therefore, the reflective optical element is not a variable optical property mirror. Moreover, a driving circuit which drives each reflecting mirror is not mounted in the mirror of Olmstead *et al.* Furthermore, Olmstead *et al.* does not disclose, teach or suggest that each reflecting surface is rotationally asymmetric. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 37.

With regard to claim 40, Figs. 39A and 39B of Olmstead *et al.* show the constitution of multi-focal lenses of reflecting type, but the focal point of each reflecting surface of the lenses is stationary. Therefore, the reflecting multi-focal lenses of Olmstead *et al.* are not adjustable reflecting mirrors. Moreover, Olmstead *et al.* does not disclose, teach or suggest the shape of a variable optical-property mirror much less the arrangement with reference to its shape. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 40.

With regard to claim 41, Figs. 39A and B of Olmstead *et al.* show the constitution of multi-focal lenses of reflecting type, but the focal point of each reflecting surface of the lenses is stationary. Therefore, Olmstead *et al.* does not disclose teach or suggest a variable optical property element. Moreover, Olmstead *et al.* does not disclose, teach or suggest an optical element having a plurality of rotationally asymmetric surfaces disposed in the vicinity of the variable optical property element. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 41.

With regard to claim 43, Figs. 39A and 39B of Olmstead *et al.* show the constitution of multi-focal lenses of reflecting type, however, the focal point of each reflecting surface of the lenses is stationary. Therefore, the reflecting multi-focal lenses of Olmstead *et al.* are not a variable optical-property mirror constructed with a variable shape mirror. Moreover, Olmstead does not disclose, teach or suggest an optical system with a rotationally asymmetric surface. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 43.

With regard to claim 45, for at least the reasons provided above, Olmstead *et al.* does not disclose, teach or suggest a variable optical property mirror unit comprising a variable optical property mirror. Moreover, Olmstead *et al.* is silent about providing an optical element having a rotationally asymmetric surface. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 45.

With regard to claim 49, for at least the reasons provided above, Olmstead *et al.* does not disclose, teach or suggest a variable optical property mirror. Moreover, Olmstead is silent about an optical element having a plurality of asymmetric surfaces and one symmetric surface. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 49.

With regard to claim 54, Olmstead *et al.* does not disclose, teach or suggest a supporting member constructed and arranged to hold the image sensor and another optical element. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 54.

With regard to claim 57, Olmstead *et al.* does not disclose, teach or suggest a plurality of reflective-type variable property elements much less that the reflective-type variable property optical elements have a zooming function or a focusing function. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 57.

With regard to claim 69, Olmstead *et al.* does not disclose, teach or suggest a reflecting type variable optical property element. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 69.

With regard to claim 72, Olmstead *et al.* does not disclose, teach or suggest an imaging apparatus by combining a variable focal-length optical system with a reflecting-type variable optical-property element, an image sensor and a display element. Moreover, Olmstead *et al.* does not disclose, teach or suggest an infrared cutoff filter or a low-pass filter. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 72.

With regard to claim 77, Olmstead *et al.* does not disclose, teach or suggest a reflecting-type variable optical-property element having a rotationally asymmetric surface. Consequently, Olmstead *et al.* does not disclose, teach or suggest the subject matter recited in claim 77.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77 and claims 38, 39, 42, 48, 55, 56, 58-66, 73-76 and 78 which are dependent from either claim 33, 41, 54, 57, 69 or 77 are patentable and respectfully request that the §103(a) rejection of claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76 and 77-78 be withdrawn.



Claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76, 77-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mori *et al.* (US Pat. No. 5,594,549). Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner contends that Mori *et al.* teaches an adjustable lens, output detection, oblong shape in a system with a lens which is reflective and that reflective variable focal length elements are known functionally equivalent alternatives and would have been obvious for that reason. Applicant respectfully disagrees.

Mori *et al.* simply teaches a lithographic projection exposure apparatus. Mori *et al.* shows in Figure 12 a plurality of lenses (projection lenses 1, 4, 7, 9, 18, 19, Fourier transformation lenses 11, 13, 21 and condenser lens 16). However, Mori *et al.* does not disclose, teach or suggest that these various lenses are adjustable. Thus, Mori *et al.* does not disclose, teach or suggest a variable optical property element, as recited in claims 33, 37, 40, 41, 43, 45, 49, 57, 69, 72 and 77. Moreover, contrary to the Examiner's contention, Mori *et al.* does not disclose, teach or suggest lenses having surfaces which are rotationally asymmetric. Therefore, Mori *et al.* does not disclose, teach or suggest an optical element having a rotationally asymmetric surface, as recited in claims 37, 41, 43, 45, 49 and 77. Furthermore, Mori *et al.* does not disclose, teach or suggest a supporting member constructed and arranged to hold an image sensor and an optical element, as recited in claim 54. Consequently, Mori *et al.* does not disclose, teach or suggest the subject matter recited in claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77 and claims 38, 39, 42, 48, 55, 56, 58-66, 73-76 and 78 which are dependent from either claim 33, 41, 54, 57, 69 or 77 are patentable and respectfully request that the §103(a) rejection of claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76 and 77-78 be withdrawn.

Claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76, 77-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hashimoto *et al.* (US Pat. No. 6,191,829). Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner admits that Hashimoto *et al.* teaches an adjustable lens, output detection, oblong shape in a system with a lens which is not reflective. The Examiner, however, contends that reflective variable focal length elements are well known functionally

equivalent alternatives and would have been obvious for that reason and the use of aspherical elements is well known for compensating for other distortions. Applicant respectfully disagrees.

Hashimoto *et al.* simply teaches an optical system for an optical disc system. Hashimoto *et al.* teaches that super resolution is obtained by optical rotary element 103. Although, Hashimoto *et al.* teaches that optical rotary element 403 in Figure 7 can be varied.

However, Hashimoto does not disclose, teach or suggest carrying out a processing for modifying the image data in response to a change of light deflective action of the variable optical property element, as recited in claim 33. Moreover, Hashimoto *et al.* does not disclose, teach or suggest that the surface of optical rotary elements 103 and 403 are rotationally asymmetric. Therefore, Hashimoto *et al.* does not disclose, teach or suggest optical elements having a rotationally asymmetric surface, as recited in claims 37, 41, 43, 45, 49 and 77.

Moreover, with regard to claim 40, Hashimoto *et al.* does not disclose, teach or suggest a variable optical-property mirror much less the shape of the reflecting surface of the mirror for reflecting an incident light. Also, there is no disclosure or suggestion of how to dispose the reflecting surface with respect to the direction of an incident light and a reflecting light. Furthermore, with regard to claim 54, Hashimoto *et al.* does disclose, teach or suggest a supporting member constructed and arranged to hold an image sensor and an optical element, as recited in claim 54. With regard to claims 57, 69, 72 and 77, Hashimoto does not disclose, teach or suggest a reflecting-type variable optical-property element, as recited in claims 57, 69, 72 and 77. Consequently, Hashimoto *et al.* does not disclose, teach or suggest the subject matter recited in claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77 and claims 38, 39, 42, 48, 55, 56, 58-66, 73-76 and 78 which are dependent from either claim 33, 41, 54, 57, 69 or 77 are patentable and respectfully request that the §103(a) rejection of claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76 and 77-78 be withdrawn.

Claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76, 77-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsuchiya *et al.* (US Pat. No. 6,025,866). Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner admits that Tsuchiya *et al.* discloses a system with a lens which is not reflective. The Examiner, however, contends that reflective variable focal length elements are well known functional equivalents and the use of aspherical elements is well known for compensating other distortion and thus would have been obvious for that reason. Applicant respectfully disagrees.

Tsuchiya *et al.* discloses a super-resolution optical pickup apparatus. The optical apparatus of Tsuchiya *et al.* includes a polarization plane rotary unit arranged between a semiconductor laser and an objective lens. However, Tsuchiya *et al.* does not disclose, teach or suggest carrying out processing for modifying the image data in response to a change of light deflective action of the variable optical property element, as recited in claim 33. Tsuchiya *et al.* does not disclose, teach or suggest that the polarization plane rotary unit is an optical element of transparent type. Moreover, Tsuchiya *et al.* does not disclose, teach or suggest that the surface of the polarization plane rotary unit is rotationally asymmetric. Therefore, Tsuchiya *et al.* does not disclose, teach or suggest a variable optical property mirror comprising a rotationally asymmetric reflecting surface of a shape wherein the length in one direction is different from that of the other direction, as recited in claim 37.

Tsuchiya *et al.* also fails to disclose, teach or suggest the shape of the reflecting surface for reflecting an incident light much less the arrangement of the shape of the reflecting surface for reflecting an incident light relative to the incident and emerging rays. Therefore, Tsuchiya *et al.* does not disclose, teach or suggest a variable optical property mirror having a reflecting surface of a shape wherein the length of one direction is longer than that of the other direction, and arranged so that the one direction of said reflecting surface coincides with a direction wherein a cross line between said reflecting surface and a plane on which rays incident on and emergent from said variable optical-property mirror lie extends, as recited in claim 40.

Tsuchiya *et al.* does not disclose, teach or suggest an optical element having a plurality of rotationally asymmetric surface as recited in claim 41. Tsuchiya *et al.* does not disclose, teach or suggest a variable optical property mirror constructed with a variable shape mirror and a rotationally asymmetric surface, as recited in claim 43. Tsuchiya *et al.* does not disclose, teach or suggest an optical element having a rotationally asymmetric surface and does not disclose, teach or suggest a variable property mirror, an image sensor disposed at a

position of an image formed by the image sensor and the variable optical property mirror, as recited in claim 45. Tsuchiya *et al.* does not disclose, teach or suggest a variable optical property mirror much less an optical element disposed at the front side or the back side of the variable optical property mirror, as recited in claim 49. Tsuchiya *et al.* does not disclose, teach or suggest a supporting member constructed and arranged to hold the image sensor and the optical element, as recited in claim 54. Tsuchiya *et al.* does not disclose, teach or suggest an optical system having a plurality of reflecting type variable optical property elements, as recited in claim 57. Tsuchiya *et al.* does not disclose, teach or suggest a variable focal-length optical system comprising a reflecting-type variable optical element, as recited in claim 69. Tsuchiya *et al.* does not disclose, teach or suggest a variable focal-length optical system comprising an infrared cutoff filter or a low-pass filter and a reflecting-type variable optical property mirror, as recited in claim 72. Tsuchiya *et al.* does not disclose, teach or suggest a reflective type variable optical property element having a rotationally asymmetric surface, as recited in claim 77. Consequently, Tsuchiya *et al.* does not disclose, teach or suggest the subject matter recited in claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77 and claims 38, 39, 42, 48, 55, 56, 58-66, 73-76 and 78 which are dependent from either claim 33, 41, 54, 57, 69 or 77 are patentable and respectfully request that the §103(a) rejection of claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76 and 77-78 be withdrawn.

Claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76, 77-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Baba *et al.* Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner contends that reflective variable focal length elements are well known functionally equivalent alternatives and would have been obvious for that reason and the use of aspherical elements is well known for compensating other distortions and also would have been obvious for that reason. Applicant respectfully disagrees.

For at least the reasons presented above, Baba *et al.* does not disclose, teach or suggest the subject matter recited in claims 33 and 37-49. Moreover, with regard to claim 54, Baba *et al.* does not disclose, teach or suggest a supporting member constructed and arranged to hold an image sensor and another optical element, as recited in claim 54. Baba *et al.* does not

disclose, teach or suggest an optical system having a plurality of reflecting type variable optical property elements, as recited in claim 57. *Baba et al.* does not disclose, teach or suggest a variable focal-length optical system comprising a reflecting-type variable optical element, as recited in claim 69. *Baba et al.* does not disclose, teach or suggest a variable focal-length optical system comprising an infrared cutoff filter or a low-pass filter and a reflecting-type variable optical property mirror, as recited in claim 72. *Baba et al.* does not disclose, teach or suggest a reflective type variable optical property element having a rotationally asymmetric surface, as recited in claim 77. Consequently, *Baba et al.* does not disclose, teach or suggest the subject matter recited in claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77 and claims 38, 39, 42, 48, 55, 56, 58-66, 73-76 and 78 which are dependent from either claim 33, 41, 54, 57, 69 or 77 are patentable and respectfully request that the §103(a) rejection of claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76 and 77-78 be withdrawn.

Claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76, 77-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sakai et al.* (US Patent No. 5,020,903). Applicant respectfully traverses this rejection for at least the following reasons.

The Examiner contends that reflective focal length elements are known functionally equivalent alternatives and would have been obvious for that reasons and the use of aspherical elements is well known for compensating other distortions and also would have been obvious for that reason. Applicant respectfully disagrees.

For at least the reasons presented above, *Sakai et al.* does not disclose, teach or suggest the subject matter recited in claims 33 and 37-49. Moreover, with regard to claim 54, *Sakai et al.* does not disclose, teach or suggest a supporting member constructed and arranged to hold an image sensor and another optical element, as recited in claim 54. *Sakai et al.* does not disclose, teach or suggest an optical system having a plurality of reflecting type variable optical property elements, as recited in claim 57. *Sakai et al.* does not disclose, teach or suggest a variable focal-length optical system comprising a reflecting-type variable optical element, as recited in claim 69. *Sakai et al.* does not disclose, teach or suggest a variable focal-length optical system comprising an infrared cutoff filter or a low-pass filter and a

reflecting-type variable optical property mirror, as recited in claim 72. Sakai *et al.* does not disclose, teach or suggest a reflective type variable optical property element having a rotationally asymmetric surface, as recited in claim 77. Consequently, Sakai *et al.* does not disclose, teach or suggest the subject matter recited in claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77.

Therefore, Applicant respectfully submits that claims 33, 37, 40, 41, 43, 45, 49, 54, 57, 69, 72 and 77 and claims 38, 39, 42, 48, 55, 56, 58-66, 73-76 and 78 which are dependent from either claim 33, 41, 54, 57, 69 or 77 are patentable and respectfully request that the §103(a) rejection of claims 33, 37-49, 54-66, 69, 70, 71, 72, 73-76 and 77-78 be withdrawn.

Claims 84 and 85 have been newly added. Claim 84 recites “an optical system constructed and arranged to form an object image, said optical system comprising a variable optical-property element; an image sensor constructed and arranged to image said object image; and a signal processing circuit constructed and arranged to process an image signal obtained by said image sensor, said signal processing circuit comprising a circuit for carrying out a process modifying said image signal in response to a change of light deflective action of said variable optical-property element.” Support for the claim language may be found throughout the specification. For example, the Examiner is directed to Figures 30 and 31 and related detailed description.

None of the relied upon references disclose, teach or suggest the subject matter recited in claim 85. Consequently, Applicant submits that claim 85 is patentable.

Claims 86 is dependent from claim 45. Therefore, for at least the reasons presented above for claim 45, Applicant submits that claims 86 is patentable.

CONCLUSION

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Attached is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **“Version with markings to show changes made”**.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 33, 37-43, 45, 48, 49, 54-57, 69-78 have been amended as follows:

33. (Amended) An optical apparatus [, wherein characteristics of an electronic circuit or procedure of image processing is changed in accordance with properties of a variable optical-property element] comprising:

an optical system constructed and arranged to form an object image, said optical system comprising a variable optical-property element;

an image sensor constructed and arranged to image said object image; and

an image processing device constructed and arranged to perform an image processing by using an image data obtained by said image sensor, said image processing device comprising a process for carrying out a process for modifying said image data in response to a change of light deflective action of said variable optical-property element.

37. (Amended) A variable optical-property mirror [having a reflecting surface and an aperture, wherein a shape of the aperture of said variable optical-property mirror is oblong, and the reflecting surface of said variable optical-property mirror is constructed to cause a direction of light emergent therefrom to be variable] unit comprising:

a variable optical-property mirror comprising a rotationally asymmetric reflecting surface of a shape wherein the length of one direction is different from that of the other direction; and

a driving circuit constructed and arranged to drive said variable optical-property mirror.

38. (Amended) A variable optical-property mirror unit according to claim 37, wherein a shape of the reflecting surface of said variable optical-property mirror unit is variable.



39. (Amended) [An optical apparatus, comprising:  
a variable optical-property mirror having a reflecting surface and an aperture,  
wherein a shape of the aperture of said variable optical-property mirror is oblong, and  
the reflecting surface of said variable optical-property mirror is constructed to cause a  
direction of light emergent therefrom to be variable,  
wherein a shape of the reflecting surface of said variable optical-property mirror is  
variable; and  
wherein said optical apparatus is configured so that the shape of the aperture of said  
variable optical-property mirror is oblong in a direction along an intersection where a plane  
on which rays incident on and emergent from said variable optical-property mirror lie meets  
said variable optical-property mirror, to thereby compensate aberrations including  
astigmatism.] A variable optical-property mirror unit according to claim 37, wherein the light  
deflection property of said reflecting surface is rotationally asymmetric.

40. (Amended) An optical apparatus comprising:  
a variable optical-property mirror having a reflecting surface [and an aperture, wherein  
a shape of the aperture of said variable optical-property mirror is oblong in a direction along  
an intersection where a plane on which rays incident on and emergent from said variable  
optical property mirror lie meets said variable optical-property mirror, and said reflecting  
surface is constructed to cause a direction of exit light therefrom to be variable.] of a shape  
wherein the length of one direction is longer than that of the other direction, and said variable  
optical-property mirror is arranged so that the one direction of said reflecting surface  
coincides with a direction wherein a cross line between said reflecting surface and a plane on  
which rays incident on and emergent from said variable optical-property mirror lie extends.

41. (Amended) An [imaging] optical device [,] comprising:  
[an optical element having a plurality of rotationally asymmetric surfaces; and a  
variable optical-property mirror disposed in a vicinity of said optical element.]  
a variable optical-property element; and  
an optical element having a plurality of rotationally asymmetric surface and disposed  
in a vicinity of said variable optical-property element.

42. (Amended) An [imaging] optical device according to claim 41, further comprising an image sensor.

43. (Amended) An optical system, [comprising] consisting of:  
a rotationally asymmetric surface; and  
a variable optical-property mirror constructed with a variable shape mirror.

45. (Amended) An [imaging device] optical system, comprising:  
an optical element having a rotationally asymmetric surface; and  
a variable optical-property mirror unit [constructed with a variable shape mirror; and  
an image sensor, wherein said variable optical-property mirror and said image sensor are  
placed on a same substrate, and said variable optical property mirror and said optical element  
constitute a whole or a part of an optical system.] comprising a variable optical-property  
mirror, an image sensor disposed at a position of an image formed by said image sensor and  
said variable optical-property mirror, and a holding member supporting both of said variable  
optical-property mirror and said image sensor.

48. (Amended) An [imaging] optical device according to 41, wherein each of said  
variable optical-property mirror and an image sensor is disposed on a surface of said optical  
element with a plurality of rotationally asymmetric surfaces.

49. (Amended) An optical system comprising:  
[a rotationally asymmetric surface; and a variable optical-property mirror, wherein  
said rotationally asymmetric surface defines only one plane of symmetry.]  
a variable optical-property mirror; and  
an optical element disposed at the front side or the back side of said variable optical-  
property mirror and having a plurality of rotationally asymmetric surfaces and one symmetric  
surface.

54. (Amended) An optical apparatus [or an assembly of an optical apparatus] comprising:

[a substrate on which an image sensor or an optical element is formed; and another optical element disposed in a vicinity of said substrate.] an image sensor and an optical element;

a supporting member constructed and arranged to hold said image sensor and said optical element; and

another optical element disposed in a vicinity of said supporting member.

55. (Amended) An optical apparatus [or an assembly of an optical apparatus according to claim 54, wherein said another optical element disposed in the vicinity of said substrate has a reflecting surface.] according to claim 54, wherein said another optical element disposed in the vicinity of said supporting member has a reflecting surface.

56. (Amended) An optical apparatus [or an assembly of an optical apparatus according to claim 54, wherein said optical apparatus or said assembly of an optical apparatus comprises a variable optical-property element.] according to claim 54, wherein said optical apparatus comprises a variable optical-property element.

57. (Amended) An optical apparatus, comprising:  
[a plurality of reflecting-type variable optical-property elements, wherein said optical apparatus is configured to perform at least one of a zooming and a focusing operation.]  
an optical system having a plurality of reflecting-type variable optical-property elements and having a zooming function or a focusing function, and said variable optical-property elements being arranged on a same optical path.

69. (Amended) An optical apparatus, comprising:  
a variable focal-length optical system comprising a reflecting-type variable optical-property element;  
[a display element; and an image sensor.]

an image sensor disposed at the position of an image formed by said variable focal-length optical system; and

a display element constructed and arranged to display an image based on an output from said image sensor.

70. (Amended) An apparatus according to claim [67, 68 or] 69, further comprising an optical element.

71. (Amended) An apparatus according to claim [67, 68 or] 69, further comprising a lens.

72. (Amended) An imaging apparatus, comprising:  
a variable focal-length optical system comprising [a reflecting-type variable optical-property element; and at least one of an infrared cutoff filter and a low-pass filter.] an infrared cutoff filter or a low-pass filter and a reflecting-type variable optical-property element;  
an image sensor disposed at the position of an image formed by said optical system;  
and  
a display element constructed and arranged to display an image based on an output from said image sensor.

73. (Amended) An apparatus according to claim [67, 68 or] 69, wherein a stop is disposed in said variable focal-length optical system.

74. (Amended) An apparatus according to claim [67, 68 or] 69, further comprising a processor.

75. (Amended) An apparatus according to claim [67, 68 or] 69, further comprising a recorder.

76. (Amended) An apparatus according to claim [67, 68 or] 69, wherein said reflecting-type variable optical-property element is constructed with a variable shape mirror.

77. (Amended) An optical apparatus, comprising:  
an optical element [molded from a material which is plastic or glass]; and  
a reflecting-type variable optical-property element [having a rotationally asymmetric surface].

78. (Amended) An optical apparatus [, comprising:  
an optical element molded from a material which is plastic or glass;  
an image sensor; and a reflecting-type variable optical-property element.]  
according to claim 77, further comprising an image sensor.

End of Appendix